Bioassays of

Florida Power and Light
Putnam Plant

East Palatka, Putnam County, Florida

NPDES #FL0032166

Sampled 5/19/92

July 1992

Biology Section
Division of Technical Services

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Biology Section
Bureau of Laboratories
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Introduction

Florida Power and Light (FP&L) Putnam Plant, East Palatka, Putnam County, Florida, NPDES #FL0032166, tests performed on 20 to 22 May, 1992.

This facility, which generates, transmits, and distributes electricity, is located on U.S. 17 in East Palatka. The sample was collected from the combined outfall 001 and 006, which is the combined stream from the cooling tower blowdown and the neutralization basin. The effluent is discharged to the St. Johns River.

The toxicity tests discussed in this report were performed in accordance with methods described by Weber, 1991, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, 4th Edition, EPA/600/4-90/027.

Results and Discussion

The FDER Biology Section performed static acute definitive toxicity bioassays with a sample of effluent from this facility. The bioassay organisms used for these tests were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Notropis leedsi*. The test results did not indicate toxicity.

Total residual chlorine was not detected in the sample. Total and unionized ammonia concentrations were 1.60 mg/L (Hach) and 0.09 mg/L, respectively. Further chemical analyses were performed on the sample and indicated the presence of metals and organic compounds (see Table 2). Chlorinated pesticides were not detected.

Conclusion

The sample of effluent from this facility, which was collected on 19 May, 1992, did not show toxicity.

Table 1. Concentration Series and Volumes Used for the Static Acute Definitive Bioassays of the FP&L Putnam Plant on 20 to 22 May, 1992.

Ceriodaphnia dubia (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	20 mL	0 mL	20 mL
25 %	15 mL	5 mL	20 mL
50 %	10 mL	10 mL	20 mL
75 %	5 mL	15 mL	20 mL
100 %	0 mL	20 mL	20 mL

Notropis leedsi (bannerfin shiner)

Concentration	Dilution Water	Sample	Total Volume
Control	500 mL	0 mL	500 mL
25 %	375 mL	125 mL	500 mL
50 %	250 mL	250 mL	500 mL
75 %	125 mL	375 mL	500 mL
100 %	0 mL	500 mL	500 mL

Table 2. Results of chemical analyses on the sample of effluent from the FP&L Putnam Plant, Putnam County, on 19 May, 1992.

Base-Neutral & Acid Extractables

Benzyl butyl phthalate	<5	µg/L	
Bis (2-ethylhexyl) phthalate	140	µg/L J	J Estimated value.

Tentative identification and estimated concentrations:

aliphatics	950	µg/L
aromatics	37	µg/L

Chlorinated Pesticides

none detected

Metals

Copper	85	µg/L
Iron	845	µg/L
Nickel	20	µg/L
Zinc	84	µg/L

Table 3. Data recorded during the acute definitive bioassays of a sample of combined cooling tower blowdown and neutralization basin effluent from the FP&L Putnam Plant, East Palatka, Putnam County, Florida, NPDES# FL0032166, on 20-22 May, 1992.

Facility:	**FP&L Putnam Plant**		NPDES #	**FL0032166**	Facility Type: **power plant**
Location:	US 17, East Palatka		Contact/District:	Rich Bowman / NE	cooling tower blowdown
County:	Putnam		Test type:	static acute definitive	& neutralization basin
Sample Collection Date:	**5/19/92**	Time: 1040	# tests:	2	Receiving Water: St. Johns River
Test Beginning Date:	5/20/92	Time: 1200	Chlorination Type:	**not chlorinated**	
Test Ending Date:	5/22/92	Time: 1200			**Page 1 of 2**

Total Residual Cl2	mg/l	Method
Field:	not measured	-
Lab:	0.0	Hach

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.60	0.02
Cond. Control Water (daphnids):	0.60	0.10
100% Sample:	1.60	0.09

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	122	169
Cond. Control Water (daphnids):	65	78
100% Sample:	78	980

Organism: ***Ceriodaphnia dubia*** Life stage: neonate
LC50: - Binomial: - Moving Average: - Probit: -

	SURVIVAL			pH			Temperature			Dissolved Oxygen			Conductivity	
Concentrations	# at 0 hr	Live at 24 hr	Live at 48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control	5	5	5	8.5	-	8.1	23.5	-	23.3	8.3	-	8.4	148	171
Control	5	5	5	-	-	8.1	-	-	-	-	-	8.4	-	-
Control	5	5	5	-	-	8.1	-	-	-	-	-	8.4	-	-
Control	5	5	5	-	-	8.1	-	-	-	-	-	8.4	-	-
25%	5	5	5	8.3	-	8.2	23.5	-	23.3	8.3	-	8.1	1230	1248
25%	5	5	5	-	-	8.2	-	-	-	-	-	8.1	-	-
25%	5	5	5	-	-	8.2	-	-	-	-	-	8.1	-	-
25%	5	5	5	-	-	8.2	-	-	-	-	-	8.1	-	-
50%	5	5	5	8.2	-	8.2	23.5	-	23.3	8.2	-	8.0	2210	2360
50%	5	5	5	-	-	8.2	-	-	-	-	-	8.0	-	-
50%	5	5	5	-	-	8.2	-	-	-	-	-	8.0	-	-
50%	5	5	5	-	-	8.2	-	-	-	-	-	8.0	-	-
75%	5	5	5	8.1	-	8.2	23.5	-	23.3	8.0	-	8.1	3200	3310
75%	5	5	5	-	-	8.2	-	-	-	-	-	8.1	-	-
75%	5	5	5	-	-	8.2	-	-	-	-	-	8.1	-	-
75%	5	5	5	-	-	8.2	-	-	-	-	-	8.1	-	-
100%	5	5	5	8.0	-	8.2	23.0	-	23.3	8.0	-	8.1	4130	4350
100%	5	5	5	-	-	8.2	-	-	-	-	-	8.1	-	-
100%	5	5	5	-	-	8.2	-	-	-	-	-	8.1	-	-
100%	5	5	5	-	-	8.2	-	-	-	-	-	8.1	-	-

Table 3 (continued). Data recorded during the acute definitive bioassays of a sample of combined cooling tower blowdown and neutralization basin effluent from the FP&L Putnam plant, East Palatka, Putnam County, Florida, NPDES# FL0032166, on 20 to 22 May, 1992.

Facility:	**FP&L Putnam Plant**		NPDES #	FL0032166	Facility Type: **power plant**
Location:	US 17, East Palatka		Contact/District:	Rich Bowman / NE	cooling tower blowdown
County:	Putnam		Test type:	static acute definitive	& neutralization basin
Sample Collection Date:	**5/19/92**	Time: 1040	# tests:	2	Receiving Water: St. Johns River
Test Beginning Date:	5/20/92	Time: 1200	Chlorination Type:	**not chlorinated**	
Test Ending Date:	5/22/92	Time: 1200			**Page 2 of 2**

Organism: ***Notropis leedsi*** Age: 12 days
LC50: - Binomial: - Moving Average: - Probit: -

	SURVIVAL			pH			Temperature			Dissolved Oxygen			Conductivity	
Concentrations	# at 0 hr	Live at 24 hr	Live at 48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control	5	5	4	7.8	8.0	8.4	23.5	22.8	23.0	8.0	8.0	8.1	-	-
Control	5	5	5	7.8	8.0	8.4	-	-	-	8.0	8.0	8.1	243	245
25%	5	5	5	7.7	7.9	8.2	23.0	22.7	22.9	8.0	7.8	8.1	-	-
25%	5	5	5	7.8	7.9	8.2	-	-	-	8.0	7.8	8.1	1338	1317
50%	5	5	5	7.8	7.8	8.1	23.0	22.6	23.0	8.0	7.7	7.7	-	-
50%	5	5	5	7.8	7.8	8.1	-	-	-	8.0	7.7	7.7	2370	2360
75%	5	5	5	7.9	7.8	7.9	23.0	22.7	23.0	7.7	7.4	7.5	-	-
75%	5	5	5	7.9	7.8	7.9	-	-	-	7.7	7.4	7.4	3350	3370
100%	5	5	5	8.0	7.8	7.8	23.0	23.0	23.1	7.5	7.1	7.0	-	-
100%	5	5	5	8.0	7.8	7.8	-	-	-	7.4	7.0	7.0	4300	4330

Total Residual Cl2	mg/l	Method
Field:	not measured	-
Lab:	0.0	Hach

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.60	0.02
Cond. Control Water (daphnids):	0.60	0.10
100% Sample:	1.60	0.09

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	122	169
Cond. Control Water (daphnids):	65	78
100% Sample:	78	980

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: FP+L Putnam 001+006
Address/City: _____
County: PUTNAM
Contact/District: RICH BOWMAN
NPDES Permit #: FL0032166 Outfall #: 001+006

Sample Collection: Date 5-19-92 Time 1040
Test Beginning: Date 5-20-92 Time 1200
Test Ending: Date 5-22-92 Time 1200
Test Organism: C. DUBIA
Life Stage/Age: < 24 HR

Test Number: 1 of 2 Test Type: Screening | (Definitive)
(Static) | Static Renewal | Flow-through

92-MAY-20-17
34368

Remarks:
RAN DEFINITVE TESTS INSTEAD OF SCHEDULED SCREENINGS DUE TO HIGH CONDUCTIVITY

Instrument Calibrations: 1367@23.9@132

	pH	DO	Temp	Cond
0 hr	7@7.10@10	8.5@24.0	23.8 @ 23.8	1009 @ 984@24.6
24 hr	7@7.10@10	8.5@24°C	23.8@23.9	1366@23.9@137
48 hr	7@7.10@10	8.5@24°C	24.0@24.0	1363@23.8@137

Conc.	Chamber #	Number Live 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	DO (mg/L) 0	24	48	Cond. (µmhos/cm) 0	24	48
control	A	5	5	5	8.5		8.1	23.5		23.3	8.3		8.4	148		171
control	B	5	5	5			8.1						8.4			
control	C	5	5	5			8.1						8.4			
control	D	5	5	5			8.1						8.4			
25%	A	5	5	5	8.3		8.2	23.5		23.3	8.3		8.1	1230		1248
25%	B	5	5	5			8.2						8.1			
25%	C	5	5	5			8.2						8.1			
25%	D	5	5	5			8.2						8.1			
50%	A	5	5	5	8.2		8.2	23.5		23.3	8.2		8.0	2210		2360
50%	B	5	5	5			8.2						8.0			
50%	C	5	5	5			8.2						8.0			
50%	D	5	5	5			8.2						8.0			
75%	A	5	5	5	8.1		8.2	23.5		23.3	8.0		8.1	3200		3310
75%	B	5	5	5			8.2						8.1			
75%	C	5	5	5			8.2						8.1			
75%	D	5	5	5			8.2						8.1			
100%	A	5	5	5	8.0		8.2	23.0		23.3	8.0		8.1	4130		4350
100%	B	5	5	5			8.2						8.1			
100%	C	5	5	5			8.2						8.1			
100%	D	5	5	5			8.2						8.1			
Measured/Loaded by:		KP	mf	mf	KP		mf	KP			KP		mf	KP		mf
Recorded by:		KP	mf	mf	DK		mf	DK			DK		mf	DK		mf

Investigators' Signatures
Kim Pearce
David Katz
Marshall Faulk

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:	Blank 0.0		not	measured	
Lab Tot. Resid. Cl2:			0.0	Hach	KWP
Alkalinity: (COND WATER HAD SAMPLE ALK IN WRONG SPOT. 14 5/21/92)	122	KP 78 65	78	Hach	DK
Hardness:	DK, 60 169	78	980	Hach	DK
Total Ammonia:	.60	.60	1.6	Hach	DK

Ammonia Meter Slope: _____ Ammonia Blank: 0.0 Salinity Sample: _____ ppt

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: FP+L Putnam 001+006
Address/City: _____
County: PUTNAM
Contact/District: RICH BOWMAN
NPDES Permit #: FL00 32166 Outfall #: 001+006

Sample Collection: Date 5-19-92 Time 1040
Test Beginning: Date 5-20-92 Time 1200
Test Ending: Date 5-22-92 Time 1200
Test Organism: N. LEEDSI
Life Stage/Age: 12 DAYS

Test Number: 2 of 2 Test Type: Screening (Definitive)
(Static) | Static Renewal | Flow-through

Remarks:

92 MAY 20-17
34368

Instrument Calibrations: 1367@23.9@12.7V

	pH	DO	Temp	Cond
0 hr	7@7, 10@10	8.5@24.0	23.8@ 23.8	1009@✓ 984@24.6
24 hr	7@7, 10@10	8.5@24°C	23.8@23.9	1366@23.9@1378
48 hr	7@7, 10@10	8.5@24°C	24.0@24.0	1363@23.8@1375

Conc.	Chamber #	Number Live 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	DO (mg/L) 0	24	48	Cond. (µmhos/cm) 0	24	48
control	8	5	5	4	7.8	8.0	8.4	23.5	22.8	23.0	8.0	8.0	8.1			
control	38	5	5	5	7.8	8.0	8.4				8.0	8.0	8.1	243	240	245
25%	14	5	5	5	7.7	7.9	8.2	23.0	22.7	22.9	8.0	7.8	8.1			
25%	74	5	5	5	7.8	7.9	8.2				8.0	7.8	8.1	1338	1290	1317
50%	32	5	5	5	7.8	7.8	8.1	23.0	22.6	23.0	8.0	7.7	7.7			
50%	61	5	5	5	7.8	7.8	8.1				8.0	7.7	7.7	2370	2310	2360
75%	19	5	5	5	7.9	7.8	7.9	23.0	22.7	23.0	7.7	7.4	7.5			
75%	57	5	5	5	7.9	7.8	7.9				7.7	7.4	7.4	3350	3310	3370
100%	30	5	5	5	8.0	7.8	7.8	23.0	23.0	23.1	7.5	7.1	7.0			
100%	326	5	5	5	8.0	7.8	7.8				7.4	7.0	7.0	4300	4250	4330
Measured/Loaded by:		KP	MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF
Recorded by:		KP	MF	MF	DK	MF	MF	DK	MF	MF	DK	MF	MF	DK	MF	MF

Investigators' Signatures

Kim Pearce
David Roth
Marshall Faircloth

Reviewer

Water-quality Parameters

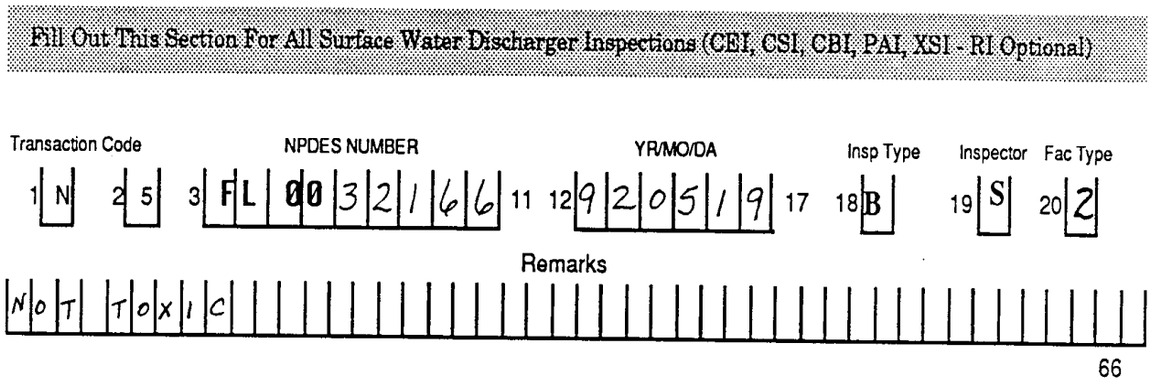
	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:	[illegible] 0.0		NOT measured		
Lab Tot. Resid. Cl2:			00	Hach	KWP
Alkalinity:	122	65	78	Hach	DK
Hardness:	164	78	980	Hach	DK
Total Ammonia:	.60	.60	16	Hach	DK

Ammonia Meter Slope: _____

Ammonia Blank: 00

Salinity Sample: _____ ppt

The Bioassays of FP & L Putnam Plant, NPDES# FL0032166, effluent sampled on May 19, 1992.



The Priority Pollutants Analysis for the Bioassays of FP & L Putnam Plant, NPDES# FL0032166, effluent sampled on May 19, 1992.

